Using electronic identification (eID) and individual performance records to drive flock improvement

Focus Farm case study

The Lymns have been selecting sheep based on individual traits for more than 20 years. They are now making faster gains thanks to eID and the collection of data on a wider range of performance traits.

Enterprise snapshot

Owners: Chris and Leanne Lymn and family
Property name: Lymn Farms
Location: Wudinna and Minnipa, Upper Eyre Peninsula, SA
Size: 4,000 ha
Brief enterprise description: Self-replacing Merino flock and 2,000 ha wheat, barley and oats
Number of employees: 2 full-time equivalents
Average annual rainfall: 270-300 mm

Background

Chris and Leanne Lymn manage a mixed dryland farm spread over 4,000 ha and 50 km between Wudinna and Minnipa on the upper Eyre Peninsula of SA. Average annual rainfall is approximately 270-300 mm. The Lymns crop 2,000 ha of wheat, barley and oats each year and run a self-replacing Merino flock of 1,500 ewes, with wether lambs and cull ewe lambs finished to export weights in their own feedlot.

This case study focusses on Lymn Farms' journey with individual animal selection and the contribution eID is now making to refine and broaden data collection and data-based decision making.

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What improvements were the Lymns looking for?

- Increase wool cut, reduce fibre diameter, maintain or improve weaning rate
- Reduce manual labour associated with weighing sheep and lambs
- Reduce labour and expense in maintaining stock water
- Easier methods for recording individual animal traits
- Easier recording of stock details and movements

What tech have they adopted?

- eID eartags in all sheep
- Radio-frequency identification (RFID) ‘wand’ for recording sheep eID in the shearing shed
- Weigh crate and panel reader for easier weighing of sheep
- Wool weight and micron testing on hoggets
- Use of Dual Purpose index to class hoggets based on wool traits and weight
- Leak detection technology on four SA Water meters
- AgriWebb management software

Fig. 1. Lambs in the Lymn Farms feedlot

Journey with data-based selection

Wool cut

The Lymns began individual animal recording in the 1970s using a weigh table with a spring balance to record weights. Ewes were raddled with a number, weights were recorded manually against number and heavier cutting ewes were kept on as breeders. Over a five-year period, this approach to selection led to heavier fleece weights – but wool became stronger and sheep became smaller. This highlighted a need to build a better understanding of sheep traits and their correlations, and to select ewes based on multiple traits, not just wool cut.

Wool cut, micron, live weight and manual recording

When Chris returned to the farm after completing an agricultural degree at Roseworthy in the early 2000s he wanted to try a new approach. He began individual animal recording using number tags on ewe replacements (hoggets) each year to see if fibre diameter could be reduced without reducing fleece

weight and body weight. Initially, an extra person was employed at shearing to read tag numbers and manually record fleece weights. Micron testing and body weights were assessed in a separate operation in the yards, using a weigh crate and side sampling with an electric handpiece, again with manual recording of tag numbers.

This led to a gradual improvement in fleece weights and wool quality over the next 10 years, without adverse impact on body weight.

Fig. 2. Aerial view of the Lymn Farms feedlot

Introduction of eID

To simplify and partially automate data collection and handling, the Lymns introduced eID eartags to ewe lambs in 2015.

Lamb weights are collected through a Combi Clamp equipped with load bars and scale head at key stages of development (usually at weaning and as hoggets) using a hand-held ‘stick reader’ to read eID.

The process used for wool data collection is as follows:

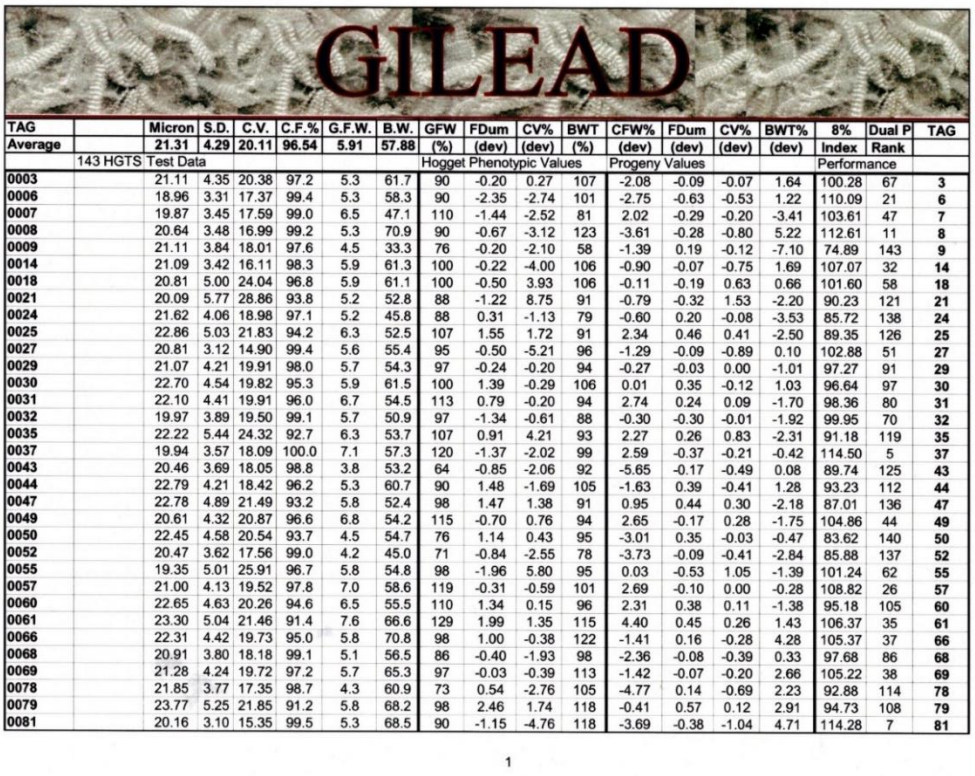
1. a stick reader/wand is used to read the eID tag number as the sheep enters the board. The reader is connected to a portable barcode printer (via Bluetooth) clipped to the operator’s belt that prints a paper copy of the barcode/eID number. The printout is attached to a clip near the shearing stand
2. the paper copy of the barcode/eID number and fleece are picked up together and put onto a weighing table with weigh bars connected to a scale head. A barcode reader is used to scan the paper copy and fleece weight is recorded
3. the paper copy of the barcode/eID number is then put in a bag with a wool sample to allow micron testing on each fleece
4. alternatively, where visual classing of wool is performed in the yards, the stick reader is used to allocate a class to an individual animal using eID.

eID for classing

Hoggets are ranked using an index based on micron, fleece weight and body weight which aligns with the Lymns’ breeding objective. Lazerline from Peterborough undertakes wool and eye muscle depth (EMD) scanning, assisting in collating data and making selection decisions. Sheep are then drafted

manually using the Combi Clamp, with the stick reader linked to a scale head indicating which sheep to keep as breeders.

The advantage of this system has been accuracy of data recording, and easier data management – and steady progress has been made in reducing fibre diameter, increasing wool cut and increasing body weight. However, according to Chris, marking rates have declined by approximately 5% over the past five years. Because hogget classing has been based on body weight and wool traits alone, there has probably been an inadvertent selection of sheep born as singles over those born as twins. The Lymns have also found that relying too heavily on wool and body traits for hogget classing has led to a slight increase in faults in feet and body conformation.



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TAG		Micron	S.D.	C.V.	C.F.%	G.F.W.	B.W.	GFW	FDum	CV%	BWT	CFW%	FDum	CV%	BWT%	8%	Dual P	TAG
Average		21.31	4.29	20.11	96.54	5.91	57.88	(%)	(dev)	(dev)	(%)	(dev)	(dev)	(dev)	(dev)	Index	Rank	
	143 HGTS Test Data							Hogget Phenotypic Values				Progeny Values				Performance		
0003		21.11	4.35	20.38	97.2	5.3	61.7	90	-0.20	0.27	107	-2.08	-0.09	-0.07	1.64	100.28	67	3
0006		18.96	3.31	17.37	99.4	5.3	58.3	90	-2.35	-2.74	101	-2.75	-0.63	-0.53	1.22	110.09	21	6
0007		19.87	3.45	17.59	99.0	6.5	47.1	110	-1.44	-2.52	81	2.02	-0.29	-0.20	-3.41	103.61	47	7
0008		20.64	3.48	16.99	99.2	5.3	70.9	90	-0.67	-3.12	123	-3.61	-0.28	-0.80	5.22	112.61	11	8
0009		21.11	3.84	18.01	97.6	4.5	33.3	76	-0.20	-2.10	58	-1.39	0.19	-0.12	-7.10	74.89	143	9
0014		21.09	3.42	16.11	98.3	5.9	61.3	100	-0.22	-4.00	106	-0.90	-0.07	-0.75	1.69	107.07	32	14
0018		20.81	5.00	24.04	96.8	5.9	61.1	100	-0.50	3.93	106	-0.11	-0.19	0.63	0.66	101.60	58	18
0021		20.09	5.77	28.86	93.8	5.2	52.8	88	-1.22	8.75	91	-0.79	-0.32	1.53	-2.20	90.23	121	21
0024		21.62	4.06	18.98	97.1	5.2	45.8	88	0.31	-1.13	79	-0.60	0.20	-0.08	-3.53	85.72	138	24
0025		22.86	5.03	21.83	94.2	6.3	52.5	107	1.55	1.72	91	2.34	0.46	0.41	-2.50	89.35	126	25
0027		20.81	3.12	14.90	99.4	5.6	55.4	95	-0.50	-5.21	96	-1.29	-0.09	-0.89	0.10	102.88	51	27
0029		21.07	4.21	19.91	98.0	5.7	54.3	97	-0.24	-0.20	94	-0.27	-0.03	0.00	-1.01	97.27	91	29
0030		22.70	4.54	19.82	95.3	5.9	61.5	100	1.39	-0.29	106	0.01	0.35	-0.12	1.03	96.64	97	30
0031		22.10	4.41	19.91	96.0	6.7	54.5	113	0.79	-0.20	94	2.74	0.24	0.09	-1.70	98.36	80	31
0032		19.97	3.89	19.50	99.1	5.7	50.9	97	-1.34	-0.61	88	-0.30	-0.30	-0.01	-1.92	99.95	70	32
0035		22.22	5.44	24.32	92.7	6.3	53.7	107	0.91	4.21	93	2.27	0.26	0.83	-2.31	91.18	119	35
0037		19.94	3.57	18.09	100.0	7.1	57.3	120	-1.37	-2.02	99	2.59	-0.37	-0.21	-0.42	114.50	5	37
0043		20.46	3.69	18.05	98.8	3.8	53.2	64	-0.85	-2.06	92	-5.65	-0.17	-0.49	0.08	89.74	125	43
0044		22.79	4.21	18.42	96.2	5.3	60.7	90	1.48	-1.69	105	-1.63	0.39	-0.41	1.28	93.23	112	44
0047		22.78	4.89	21.49	93.2	5.8	52.4	98	1.47	1.38	91	0.95	0.44	0.30	-2.18	87.01	136	47
0049		20.61	4.32	20.87	96.6	6.8	54.2	115	-0.70	0.76	94	2.65	-0.17	0.28	-1.75	104.86	44	49
0050		22.45	4.58	20.54	93.7	4.5	54.7	76	1.14	0.43	95	-3.01	0.35	-0.03	-0.47	83.62	140	50
0052		20.47	3.62	17.56	99.0	4.2	45.0	71	-0.84	-2.55	78	-3.73	-0.09	-0.41	-2.84	85.88	137	52
0055		19.35	5.01	25.91	96.7	5.8	54.8	98	-1.96	5.80	95	0.03	-0.53	1.05	-1.39	101.24	62	55
0057		21.00	4.13	19.52	97.8	7.0	58.6	119	-0.31	-0.59	101	2.69	-0.10	0.00	-0.28	108.82	26	57
0060		22.65	4.63	20.26	94.6	6.5	55.5	110	1.34	0.15	96	2.31	0.38	0.11	-1.38	95.18	105	60
0061		23.30	5.04	21.46	91.4	7.6	66.6	129	1.99	1.35	115	4.40	0.45	0.26	1.43	106.37	35	61
0066		22.31	4.42	19.73	95.0	5.8	70.8	98	1.00	-0.38	122	-1.41	0.16	-0.28	4.28	105.37	37	66
0068		20.91	3.80	18.18	99.1	5.1	56.5	86	-0.40	-1.93	98	-2.36	-0.08	-0.39	0.33	97.68	86	68
0069		21.28	4.24	19.72	97.2	5.7	65.3	97	-0.03	-0.39	113	-1.42	-0.07	-0.20	2.66	105.22	38	69
0078		21.85	3.77	17.35	98.7	4.3	60.9	73	0.54	-2.76	105	-4.77	0.14	-0.69	2.23	92.88	114	78
0079		23.77	5.25	21.85	91.2	5.8	68.2	98	2.46	1.74	118	-0.41	0.57	0.12	2.91	94.73	108	79
0081		20.16	3.10	15.35	99.5	5.3	68.5	90	-1.15	-4.76	118	-3.69	-0.38	-1.04	4.71	114.28	7	81

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Fig. 3. The Lymns' index targets production with a balance of income from wool and meat production from lambs

Next steps

The next step for the Lymns' flock is going to be scanning ewes for litter size each year, recording pregnancy status (multiples, singles and drys) using eID while ewes are in the scanning crate. Ewes that 'lamb and lose' will also be identified at lamb marking (with this recorded for individual animals using eID). This will generate data on lifelong productivity for each ewe, allowing:

- ewes bearing multiples to be run separately, fed better and given the best lambing paddocks
- lambs born as twins to be identified/marked (either with numbered tags or eID-based recording), enabling preferential selection of hoggets born as twins, helping drive fertility
- culling of less productive ewes (e.g. ewes that twice fail to raise a lamb)
- potential retention of most productive ewes for an extra year.

Chris and Leanne will also place more emphasis on checking hoggets for visual faults in future, noting that you cannot just rely on studs to keep your flock fault-free.

Fig. 4. A Combi Clamp, together with weigh bars, scale head and stick reader, is used to manually draft out hoggets to keep on as breeders, with selections based on individual wool and body weight records.

Other technologies and approaches used by the Lymns

- In addition to eID, another key technology the Lymns have implemented has been leak detection units on SA Water meters, fitted by Alpha Group Consulting. Messages are sent to Chris's phone and email, providing information on daily total and minimum flows. According to Chris, this has led to faster detection of water leaks, big savings in water bills and helped avoid stock losses from lack of water supply – and has been especially beneficial given the distance between properties.
- Chris and Leanne are also trialling AgriWebb. Chris says the software has great features for a livestock enterprise, but that he 'needs to get better' at utilising it.
- Chris and Leanne have set up a feedlot – a necessity in their environment, according to Chris – allowing them to get sheep out of paddocks over the long summer and autumn, and to 'finish' lambs as they lamb later than many in the district.
- Six-monthly shearing (March and October) is used on the property to optimise staple length and quality and for animal health benefits, even though getting wool to optimal length can be a challenge.

Fig. 5. A sheep with 6 months' wool, ready for shearing in October

Lessons learnt

- eID has been a key enabling technology that allows multiple traits to be recorded against individual animals.
- Pregnancy scanning is likely to be an important next step in improving flock reproductive performance.
- It is important to select for multiple traits, otherwise gains in one area (e.g. wool cut, body weight) can be offset by losses in another area (e.g. wool quality, fertility) due to negative trait correlations.
- Leak detection technology has led to big savings in water bills and improved water security.

One final message from Chris:

'If you're thinking of getting into eID and wool data collection, make sure all electronic equipment is fully charged, paired and working before the shearers arrive – shearers hate waiting around while technical glitches are sorted!'

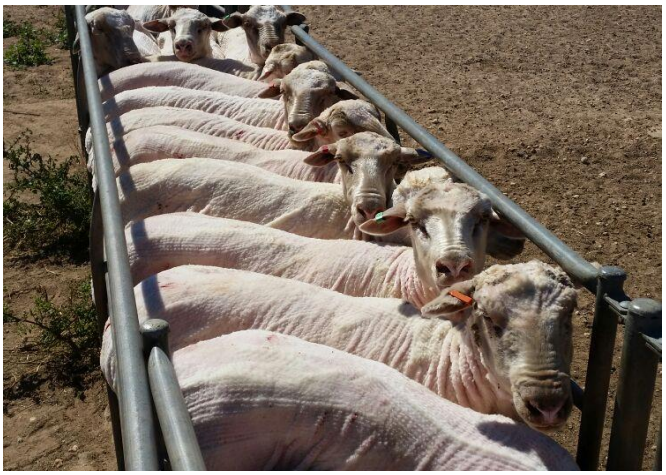

Fig. 6. Sheep lined up for backlining at Lymn Farms

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Visit pir.sa.gov.au/redmeatandwool for more information.

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